NON-ALARM TRANSMISSION AND SIGNALING TROUBLE LOCATION

This Section provides trouble location information for non-alarm transmission and signaling troubles on a D448 terminal. This Section must be used in conjunction with Section ITTR-18-443 (Channel Units — Single-Ended Transmission Tests) or Section ITTR-18-445 (Channel Units — End-to-End Transmission Tests).

This Section has been reissued to include information on the handling of CMOS-equipped units.

The information contained in this Section applies only to non-alarm problems. For alarm trouble location, refer to Section ITTR-18-531 for Mode 1, Section ITTR-18-532 for Mode 2, or Section ITTR-18-533 for Mode 3.

WARNING: This equipment contains static-sensitive (CMOS) devices. Section ITTR-18-599 contains handling instructions for CMOS-equipped units.

The trouble location procedures are contained in nine GO/NO GO diagrams. Each diagram identifies the initial trouble symptom, according to Table A. Explanations of the symbols used in the GO/NO GO diagrams are provided in Table B.

TABLE A

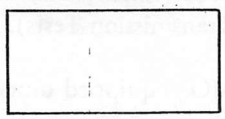
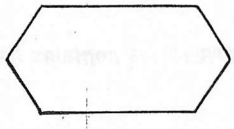
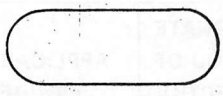
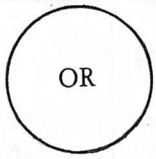
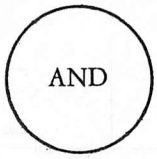
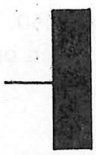
TROUBLE LOCATION DIAGRAMS

INITIAL TROUBLE SYMPTOM	RECOMMENDED METHOD OF CORRECTION	APPLICABLE FIGURE	ALTERNATE METHOD OF CORRECTION	APPLICABLE FIGURE
Level Problem	Single-ended*	1	Looped† or End-to-end‡	2 3
Noise Problem	Single-ended*	4	Looped† or End-to-end‡	5 6
Echo	Single-ended*	7	—	—
Impulse Noise	End-to-end**	8	—	—
Signaling Problem	End-to-end**	9	—	—

*Requires the use of the automated test and alignment unit (ATAU), 628450.
†Requires the use of discrete test equipment and the terminal must be taken out of service.
‡Either an ATAU or discrete test equipment may be used.
**Requires the use of discrete test equipment.

TABLE B

SYMBOL DESCRIPTIONS

SYMBOL	NAME	DESCRIPTION
	Instruction Block	An instruction block is used to enclose a discrete statement. Each block has a reference number in brackets [ ]. This is for reference only and does not imply sequence.
	Decision Block	A decision block is used to enclose an interrogative statement. Each block has a reference number in brackets [ ]. This is for reference only and does not imply sequence. Each block normally has two responses (Yes-No); however, multiple responses are possible. For example, two "Yes" responses will be numbered Yes (1) and Yes (2). Always try the (1) response first. If the problem is not corrected, repeat the procedure with the (2) response.
	Reference Bubble	A reference bubble is used at the termination of a flowline to represent an exit from that figure or subfigure.
	OR Operation	The OR operation symbol is a junction point within a procedure. It is used where the same result can be accomplished by performing different instructions. Once a single input instruction has been successful, the result has been accomplished.
	AND Operation	The AND operation symbol is a junction point within a procedure. It indicates that each input (instruction) must be performed in the order given to accomplish the output.
	End-of-Procedure	The end-of-procedure symbol is used to denote that the flow-charted procedure, as defined by the procedure title, has been completed.

When replacing a unit during trouble location procedures, the options on the new unit should be selected identically to the options on the replaced unit. When a unit is replaced and the trouble does not clear, the original unit should be reinstalled in its position. When testing or replacing channel units, the remainder of the terminal (or digroup) may remain in service (except when performing a procedure on a looped basis). However, when common equipment units are replaced, the terminal (or digroup) must be taken out of service.

APPARATUS (PER TERMINAL TO BE TESTED)

1—ATAU (ITT Part No. 628450-000-001)

1—Test interface unit (TIU) (ITT Part No. 628455-000-001)

1—Impulse noise set (WE J94006, Northeast Electronics Corporation 58B, or equivalent)

1—Card jack/310 patch cord (ITT Part No. 600397-540-003)

1—Channel unit test adapter (ITT Part No. 600397-540-005)

1—900- or 600-ohm resistor, 1/2W, 5%

1—2.15 uF capacitor, non-polarized

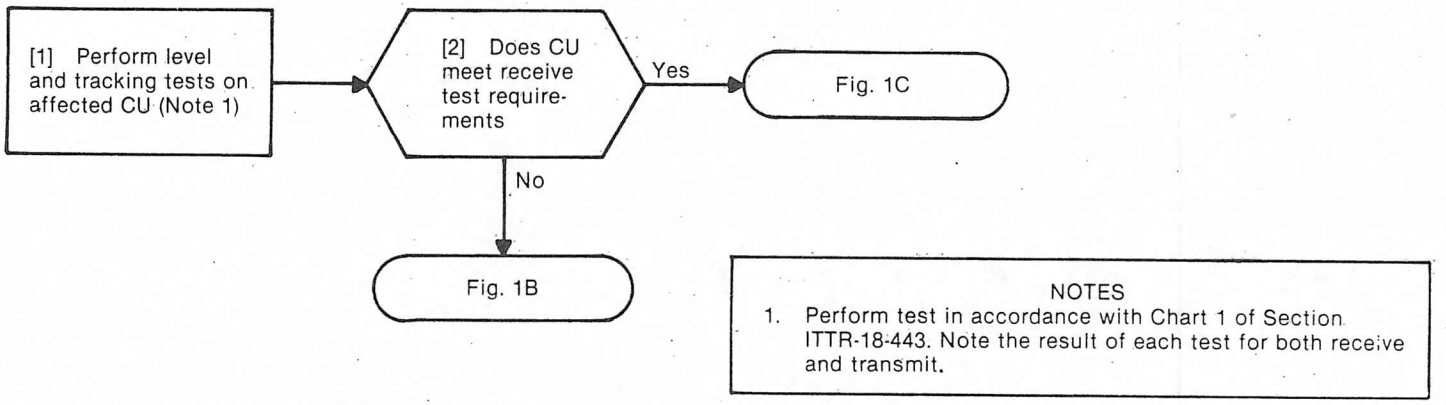

[1] Perform level and tracking tests on affected CU (Note 1)
[2] Does CU meet receive test require-ments
Yes
Fig. 1C
No
Fig. 1B
NOTES
1. Perform test in accordance with Chart 1 of Section ITTR-18-443. Note the result of each test for both receive and transmit.

Fig. 1A—Level Problem Trouble Location (Single-Ended)

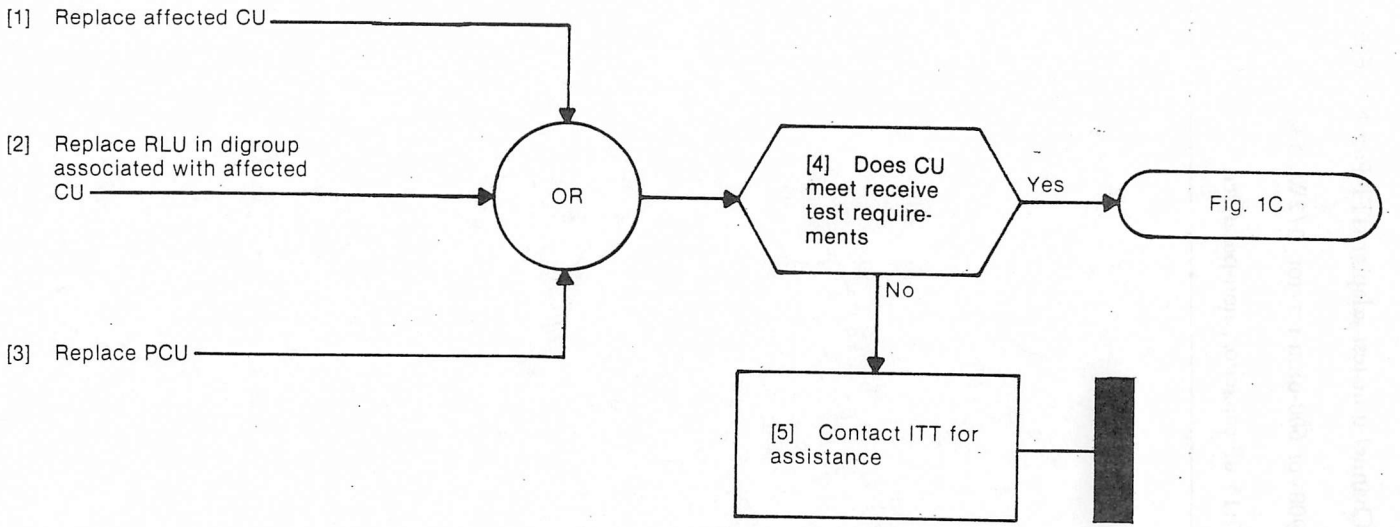


Fig. 1B—Level Problem Trouble Location (Single-Ended)

A1835

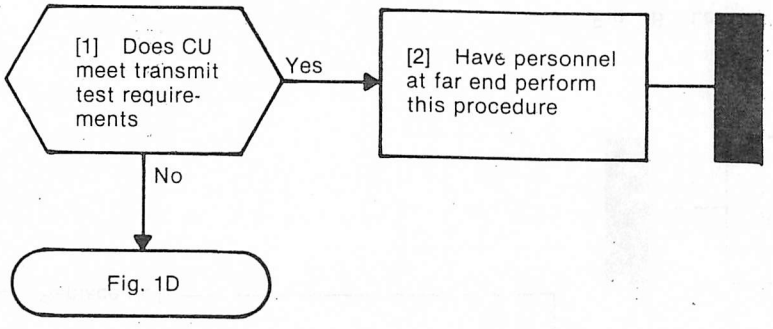


Fig. 1C—Level Problem Trouble Location (Single-Ended)

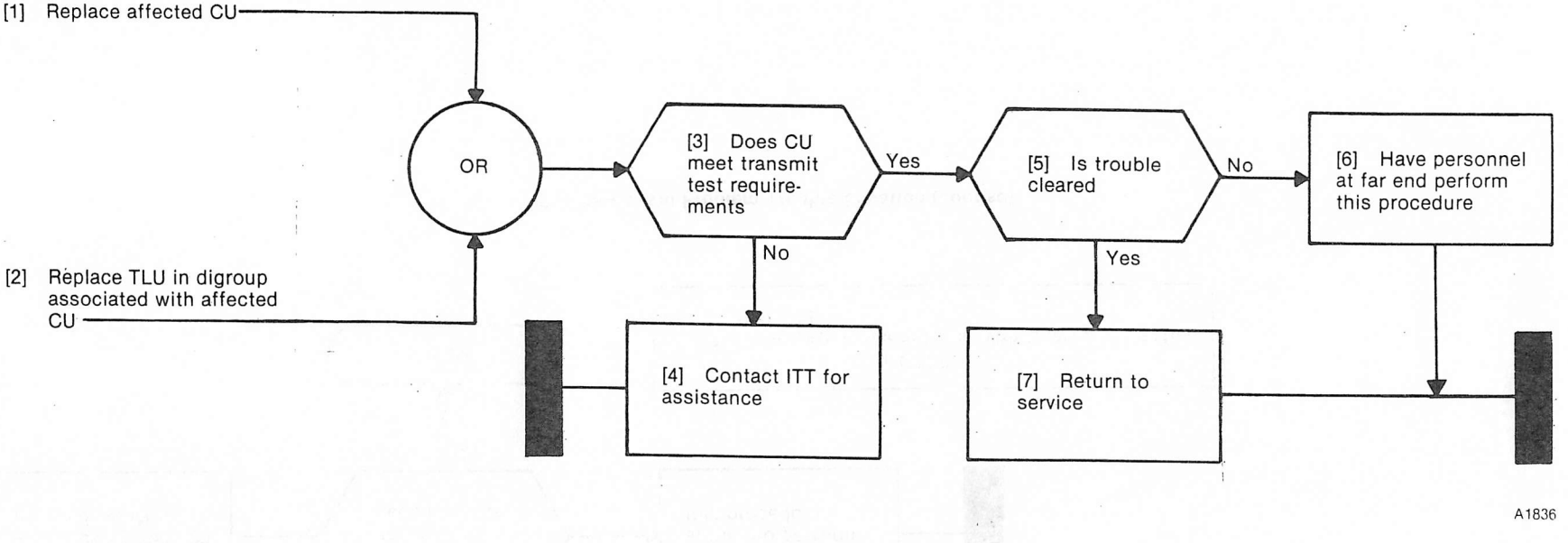


Fig. 1D—Level Problem Trouble Location (Single-Ended)

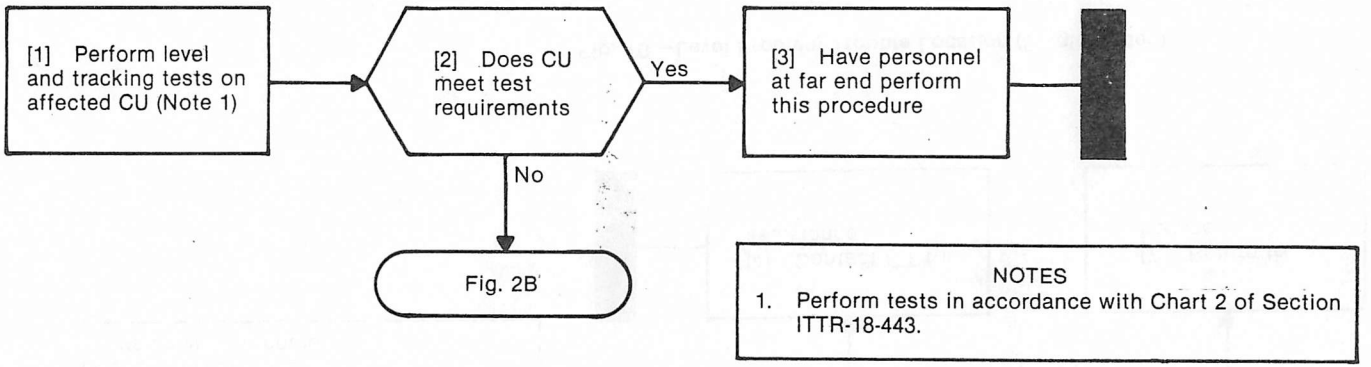

[1] Perform level and tracking tests on affected CU (Note 1)
[2] Does CU meet test requirements
Yes
No
[3] Have personnel at far end perform this procedure
Fig. 2B
NOTES
1. Perform tests in accordance with Chart 2 of Section ITTR-18-443.

Fig. 2A—Level Problem Trouble Location (Looped)

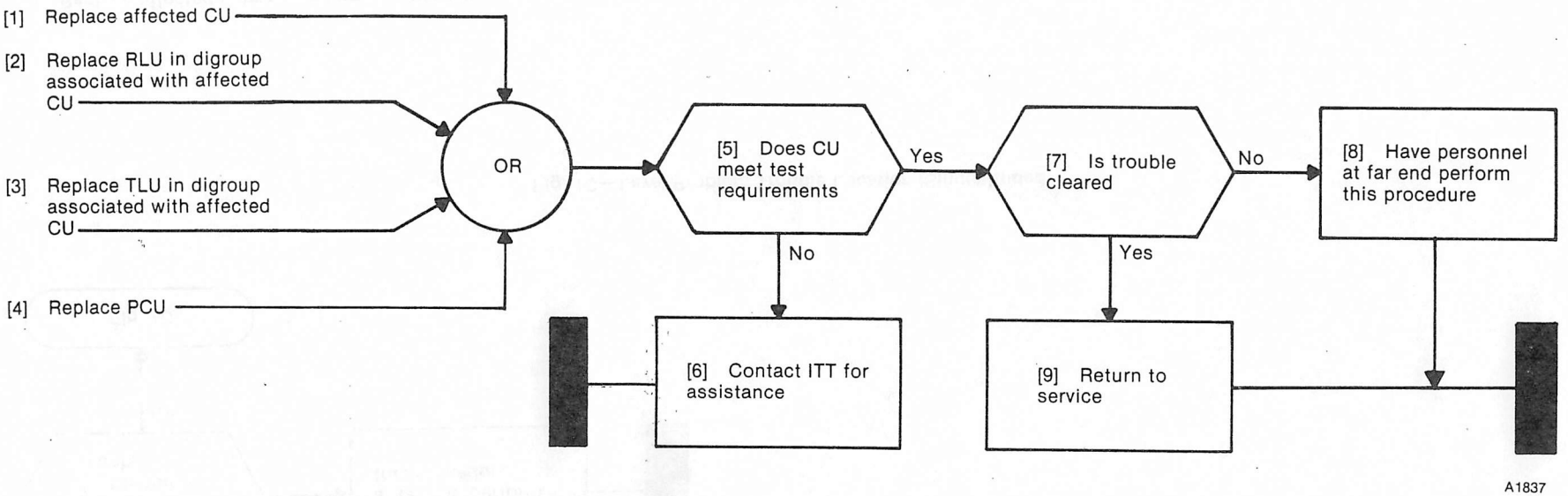


Fig. 2B—Level Problem Trouble Location (Looped)

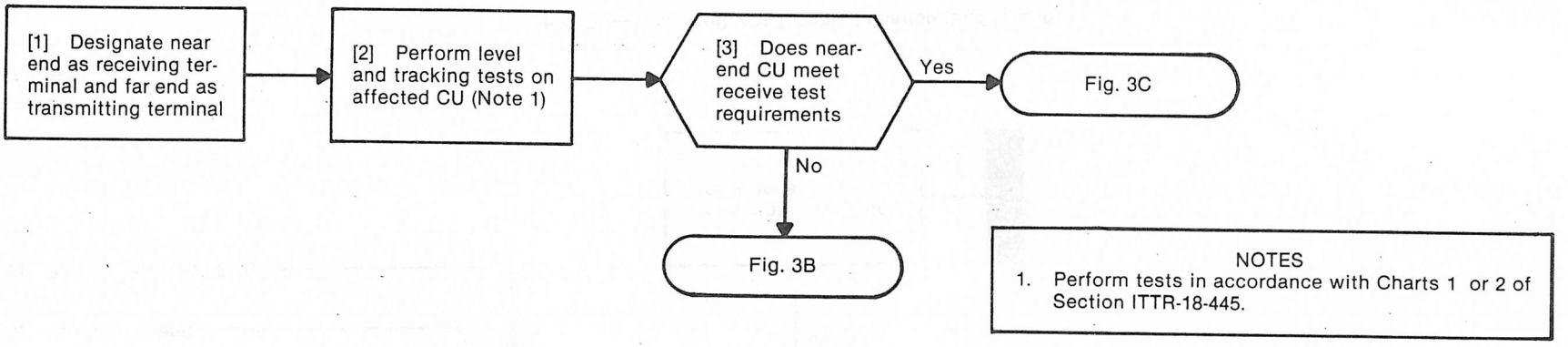

[1] Designate near end as receiving terminal and far end as transmitting terminal
[2] Perform level and tracking tests on affected CU (Note 1)
[3] Does near-end CU meet receive test requirements
Yes
Fig. 3C
No
Fig. 3B
NOTES
1. Perform tests in accordance with Charts 1 or 2 of Section ITTR-18-445.

Fig. 3A—Level Problem Trouble Location (End-to-End)

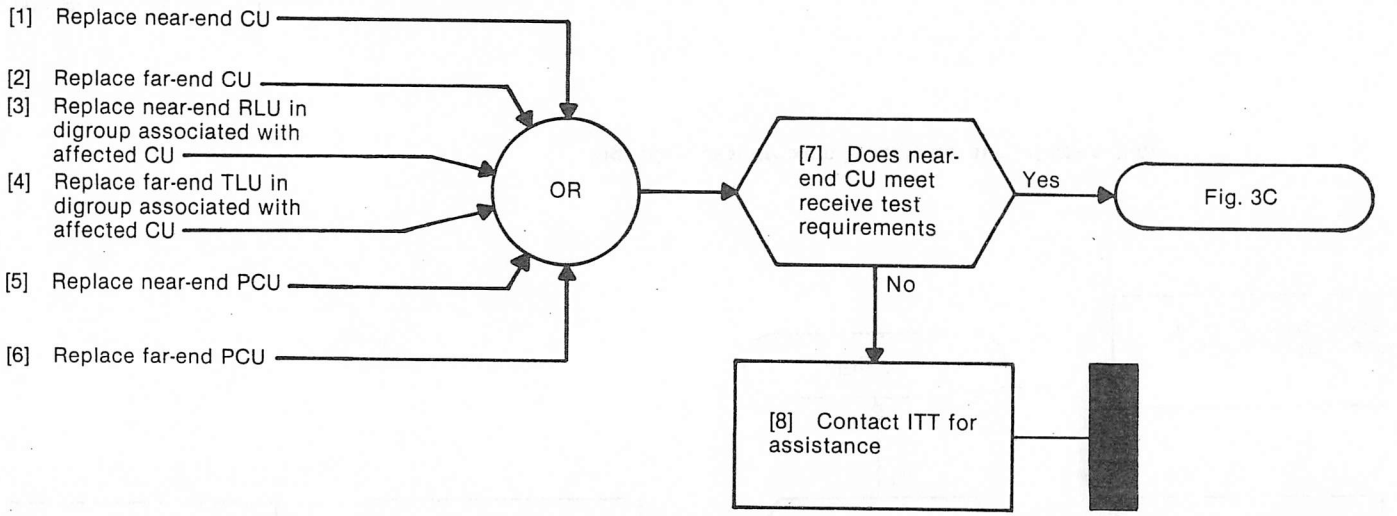

[1] Replace near-end CU
[2] Replace far-end CU
[3] Replace near-end RLU in digroup associated with affected CU
[4] Replace far-end TLU in digroup associated with affected CU
[5] Replace near-end PCU
[6] Replace far-end PCU
OR
[7] Does near-end CU meet receive test requirements
Yes
Fig. 3C
No
[8] Contact ITT for assistance
A1838

Fig. 3B—Level Problem Trouble Location (End-to-End)

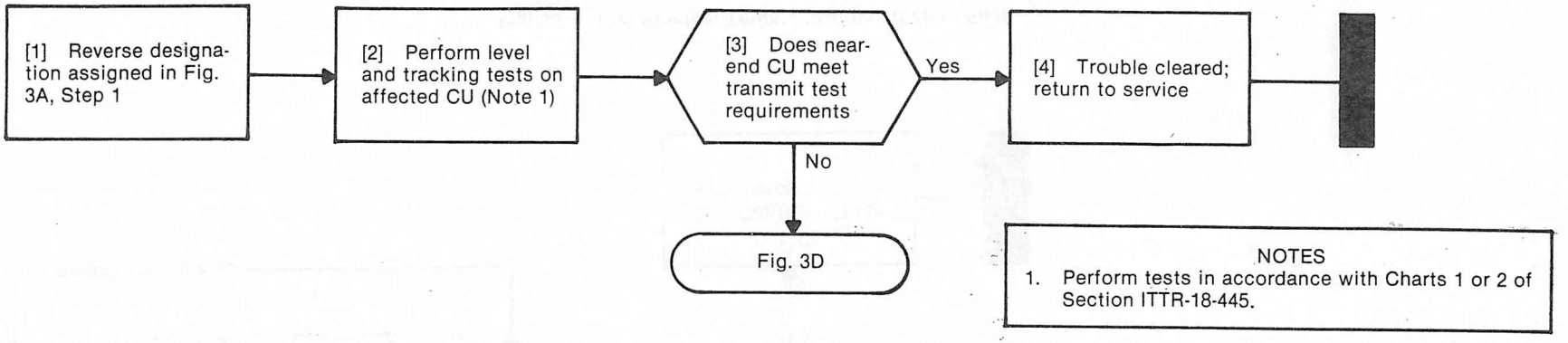

[1] Reverse designation assigned in Fig. 3A, Step 1
[2] Perform level and tracking tests on affected CU (Note 1)
[3] Does near-end CU meet transmit test requirements
Yes
[4] Trouble cleared; return to service
No
Fig. 3D
NOTES
1. Perform tests in accordance with Charts 1 or 2 of Section ITTR-18-445.

Fig. 3C—Level Problem Trouble Location (End-to-End)

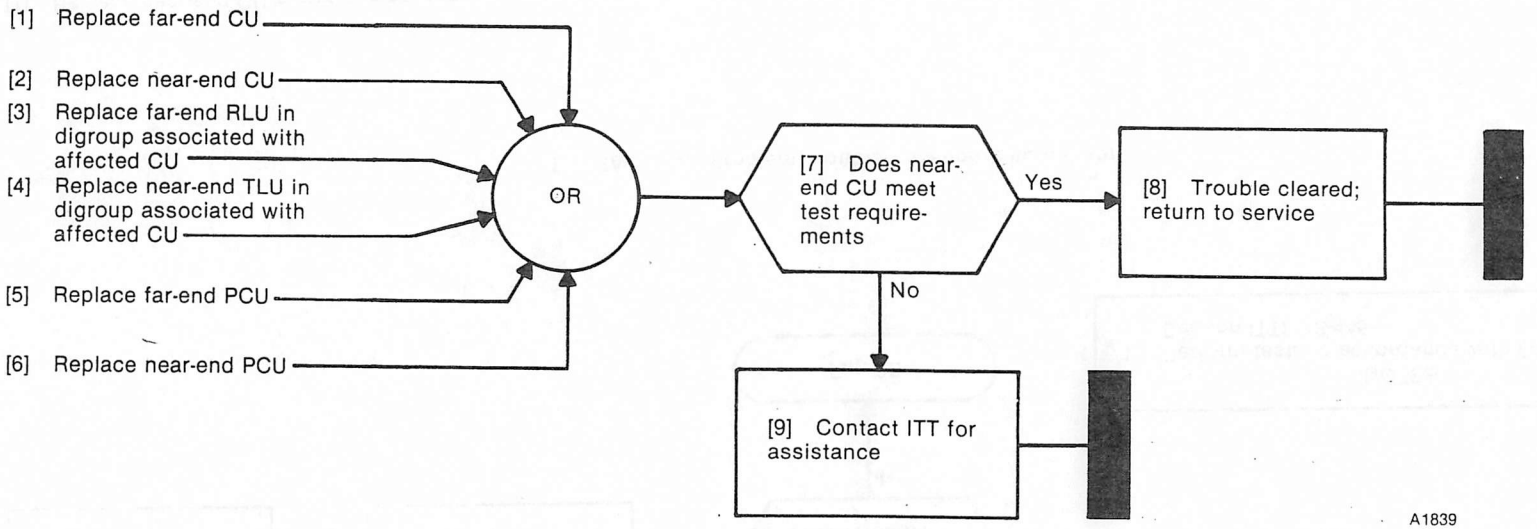

[1] Replace far-end CU
[2] Replace near-end CU
[3] Replace far-end RLU in digroup associated with affected CU
[4] Replace near-end TLU in digroup associated with affected CU
[5] Replace far-end PCU
[6] Replace near-end PCU
OR
[7] Does near-end CU meet test requirements
Yes
[8] Trouble cleared; return to service
No
[9] Contact ITT for assistance
A1839

Fig. 3D—Level Problem Trouble Location (End-to-End)

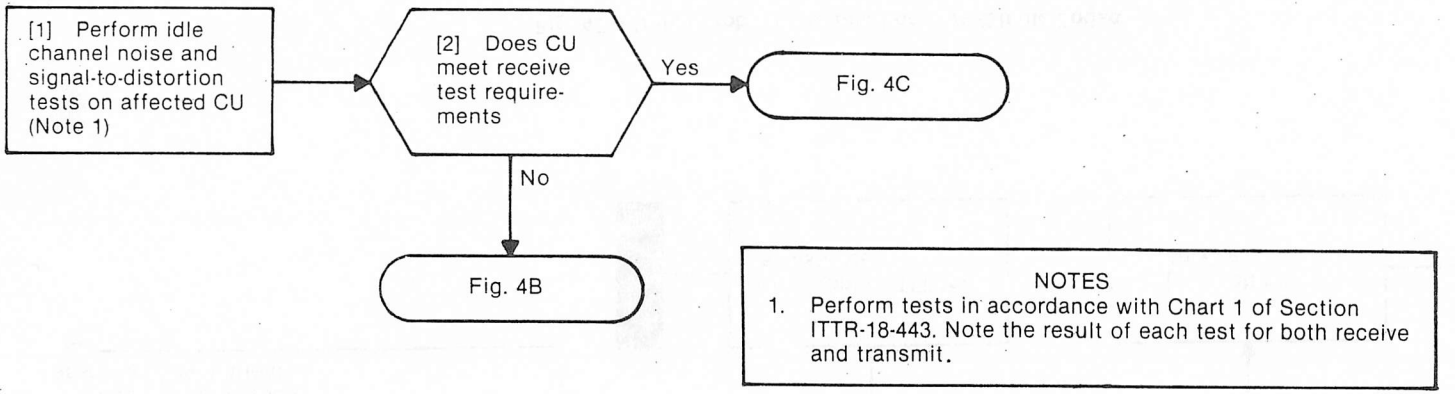
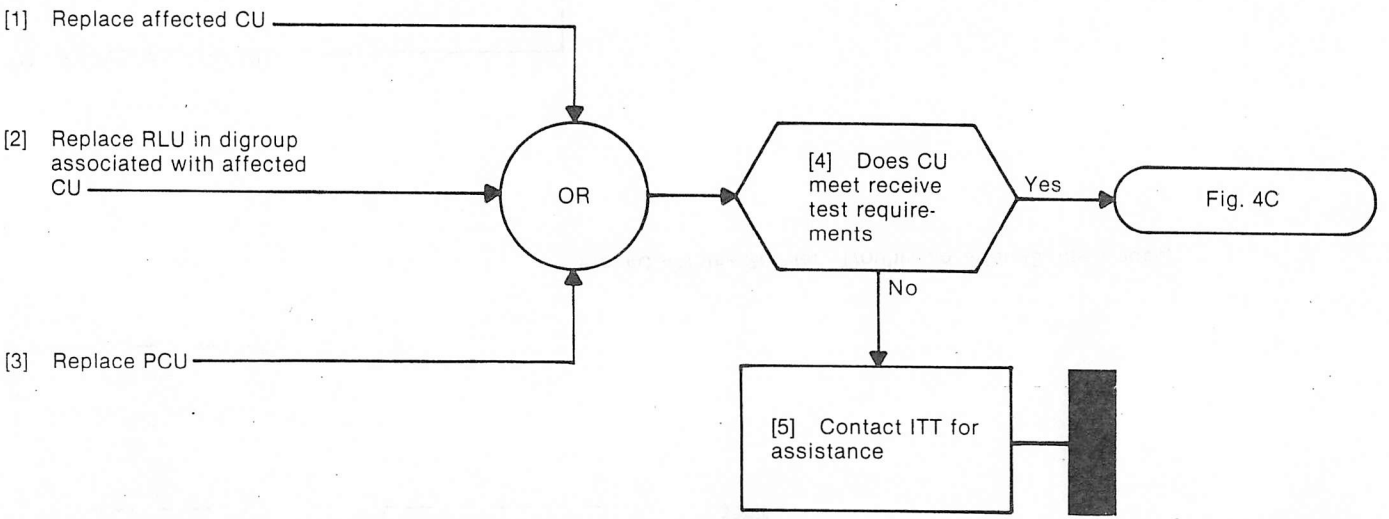

[1] Perform idle channel noise and signal-to-distortion tests on affected CU (Note 1)
[2] Does CU meet receive test require-ments
Yes
Fig. 4C
No
Fig. 4B
NOTES
1. Perform tests in accordance with Chart 1 of Section ITTR-18-443. Note the result of each test for both receive and transmit.

Fig. 4A—Noise Problem Trouble Location (Single-Ended)



A1840

Fig. 4B—Noise Problem Trouble Location (Single-Ended)

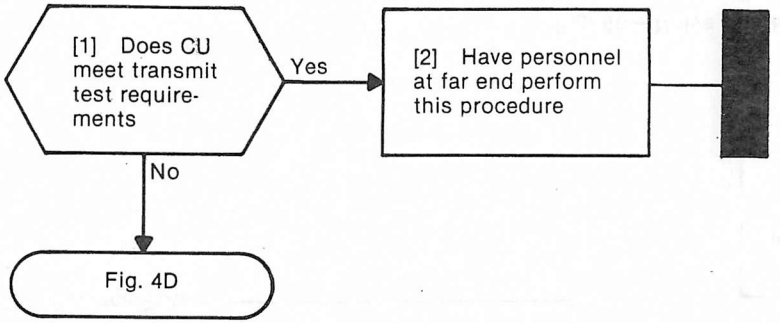


Fig. 4C—Noise Problem Trouble Location (Single-Ended)

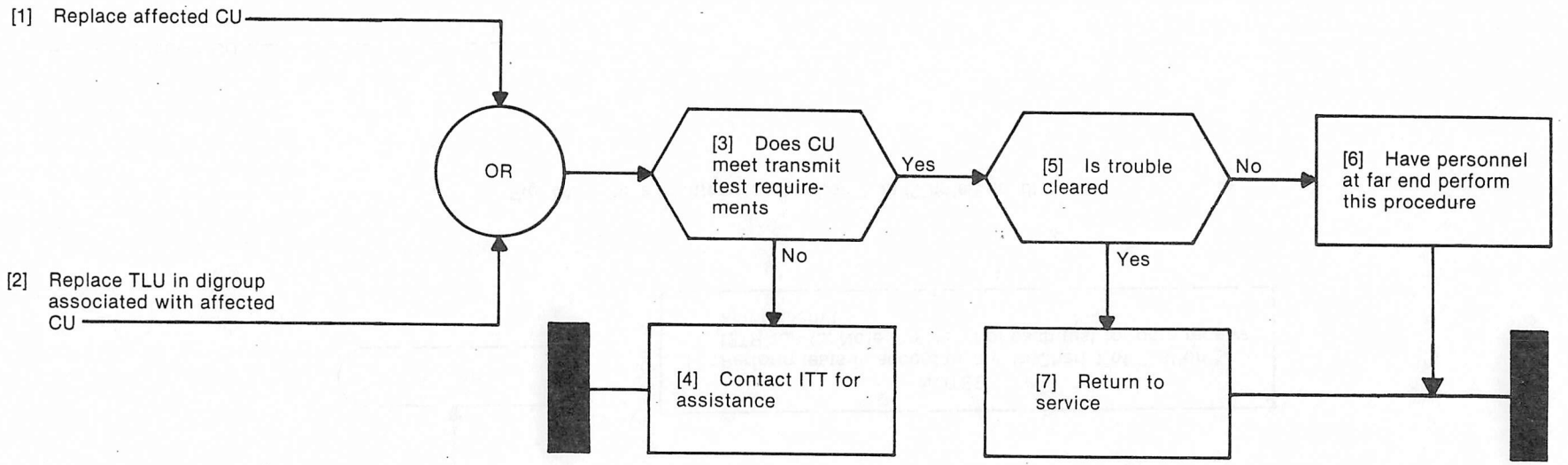


Fig. 4D—Noise Problem Trouble Location (Single-Ended)

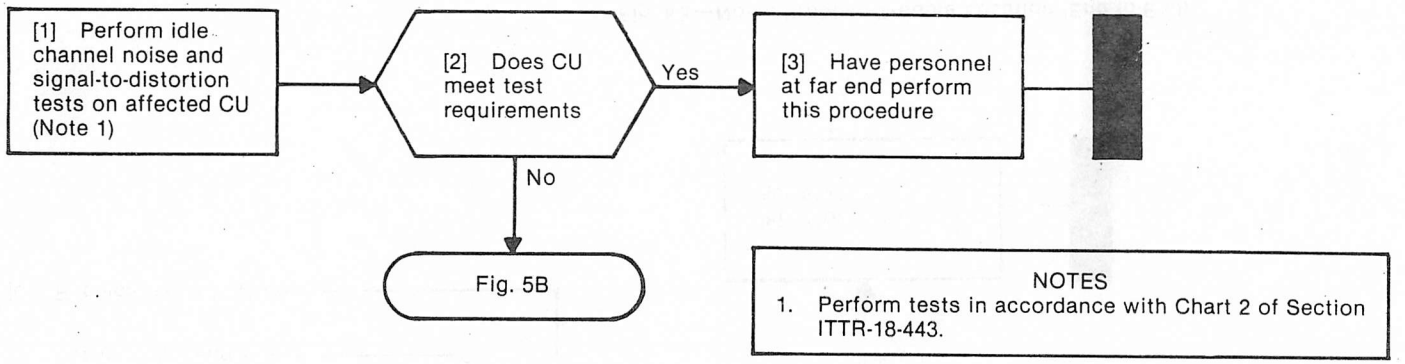

[1] Perform idle channel noise and signal-to-distortion tests on affected CU (Note 1)
[2] Does CU meet test requirements
Yes
[3] Have personnel at far end perform this procedure
No
Fig. 5B
NOTES
1. Perform tests in accordance with Chart 2 of Section ITTR-18-443.

Fig. 5A—Noise Problem Trouble Location (Looped)

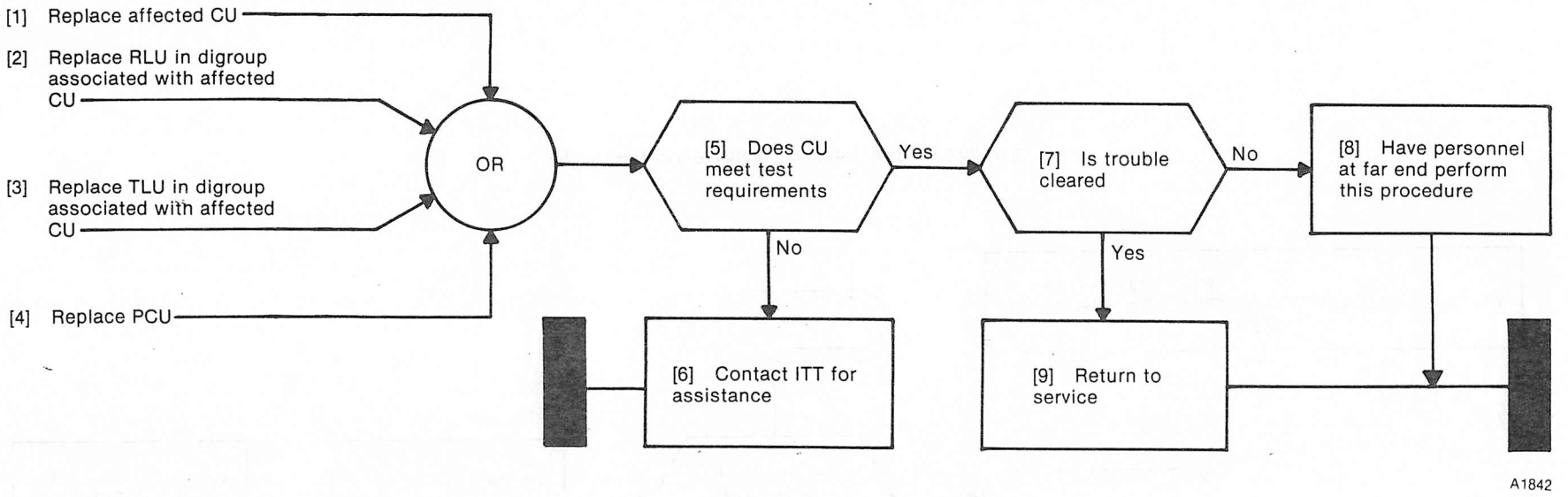


Fig. 5B—Noise Problem Trouble Location (Looped)

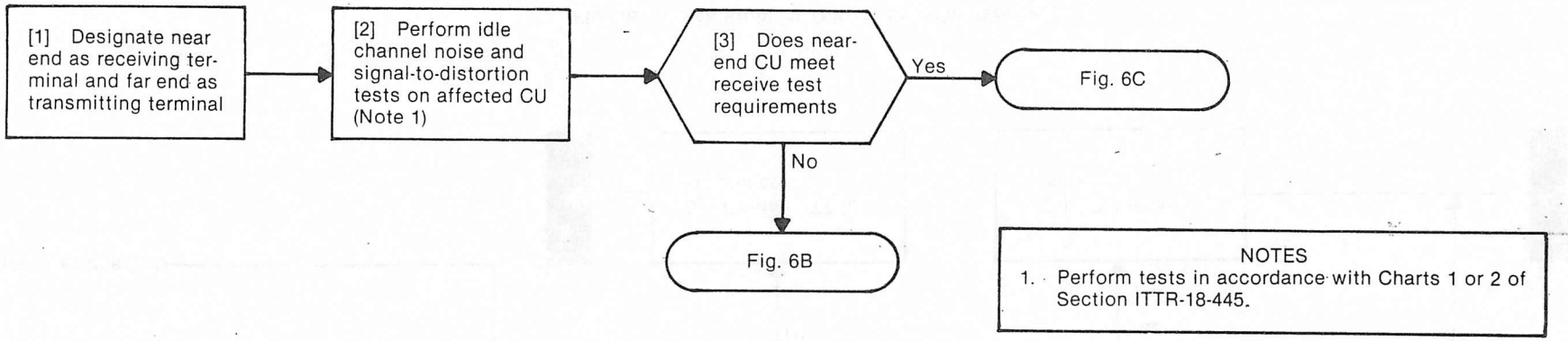

[1] Designate near end as receiving terminal and far end as transmitting terminal
[2] Perform idle channel noise and signal-to-distortion tests on affected CU (Note 1)
[3] Does near-end CU meet receive test requirements
Yes
Fig. 6C
No
Fig. 6B
NOTES
1. Perform tests in accordance with Charts 1 or 2 of Section ITTR-18-445.

Fig. 6A—Noise Problem Trouble Location (End-to-End)

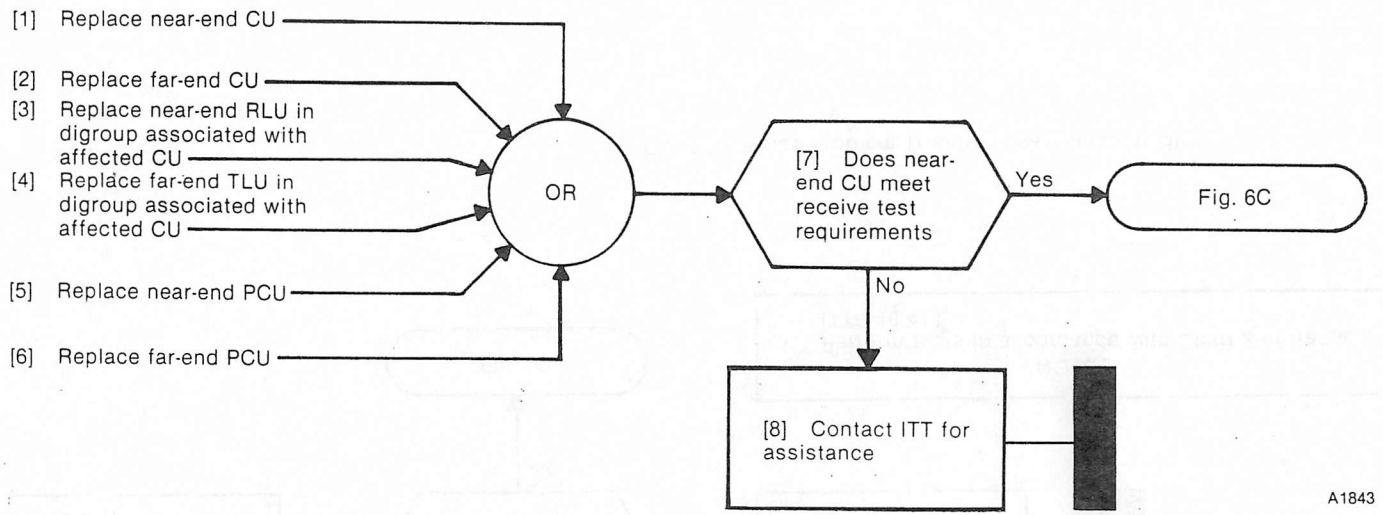

[1] Replace near-end CU
[2] Replace far-end CU
[3] Replace near-end RLU in digroup associated with affected CU
[4] Replace far-end TLU in digroup associated with affected CU
[5] Replace near-end PCU
[6] Replace far-end PCU
OR
[7] Does near-end CU meet receive test requirements
Yes
Fig. 6C
No
[8] Contact ITT for assistance
A1843

Fig. 6B—Noise Problem Trouble Location (End-to-End)

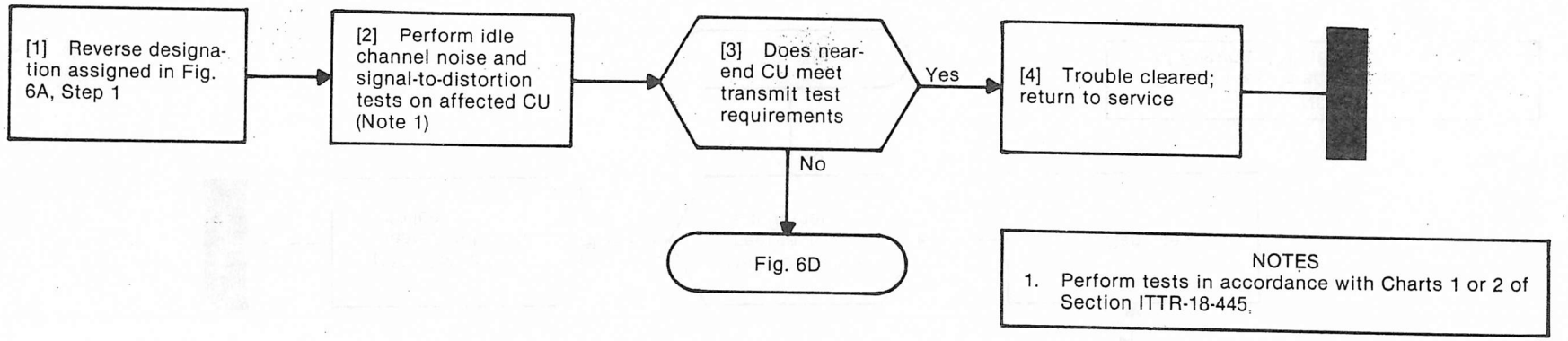

[1] Reverse designation assigned in Fig. 6A, Step 1
[2] Perform idle channel noise and signal-to-distortion tests on affected CU (Note 1)
[3] Does near-end CU meet transmit test requirements
Yes
No
[4] Trouble cleared; return to service
Fig. 6D
NOTES
1. Perform tests in accordance with Charts 1 or 2 of Section ITTR-18-445.

Fig. 6C—Noise Problem Trouble Location (End-to-End)

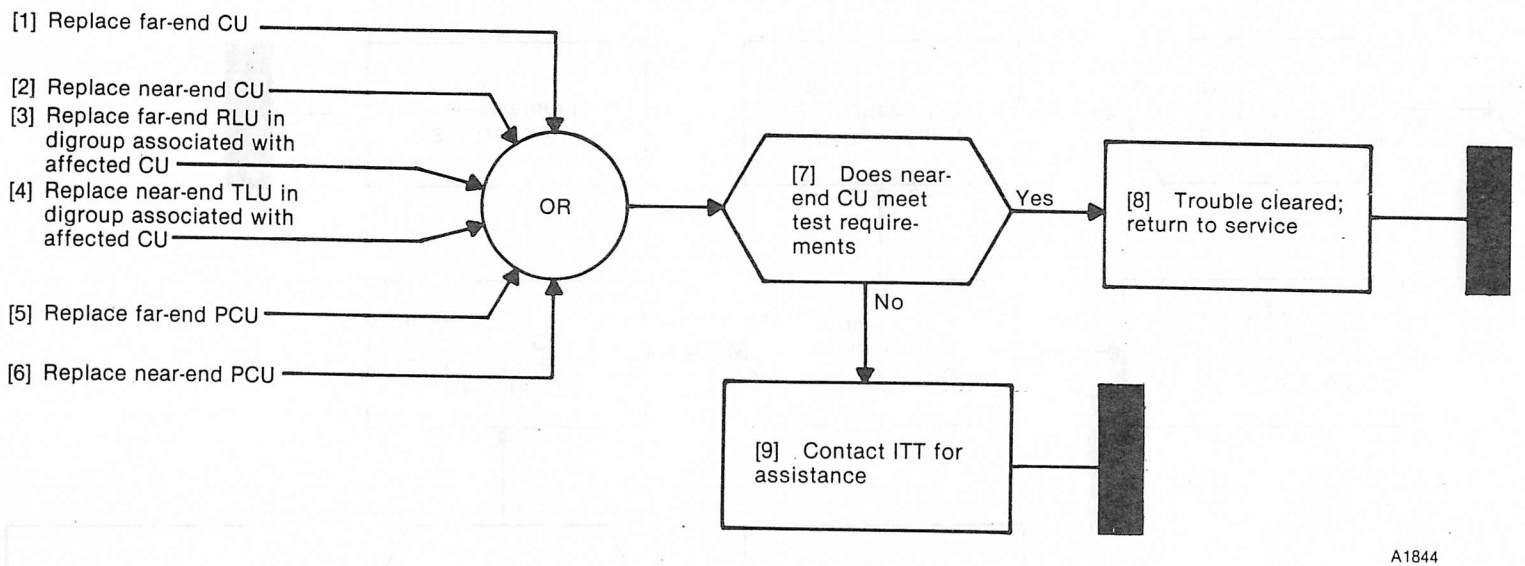

[1] Replace far-end CU
[2] Replace near-end CU
[3] Replace far-end RLU in digroup associated with affected CU
[4] Replace near-end TLU in digroup associated with affected CU
[5] Replace far-end PCU
[6] Replace near-end PCU
OR
[7] Does near-end CU meet test requirements
Yes
No
[8] Trouble cleared; return to service
[9] Contact ITT for assistance
A1844

Fig. 6D—Noise Problem Trouble Location (End-to-End)

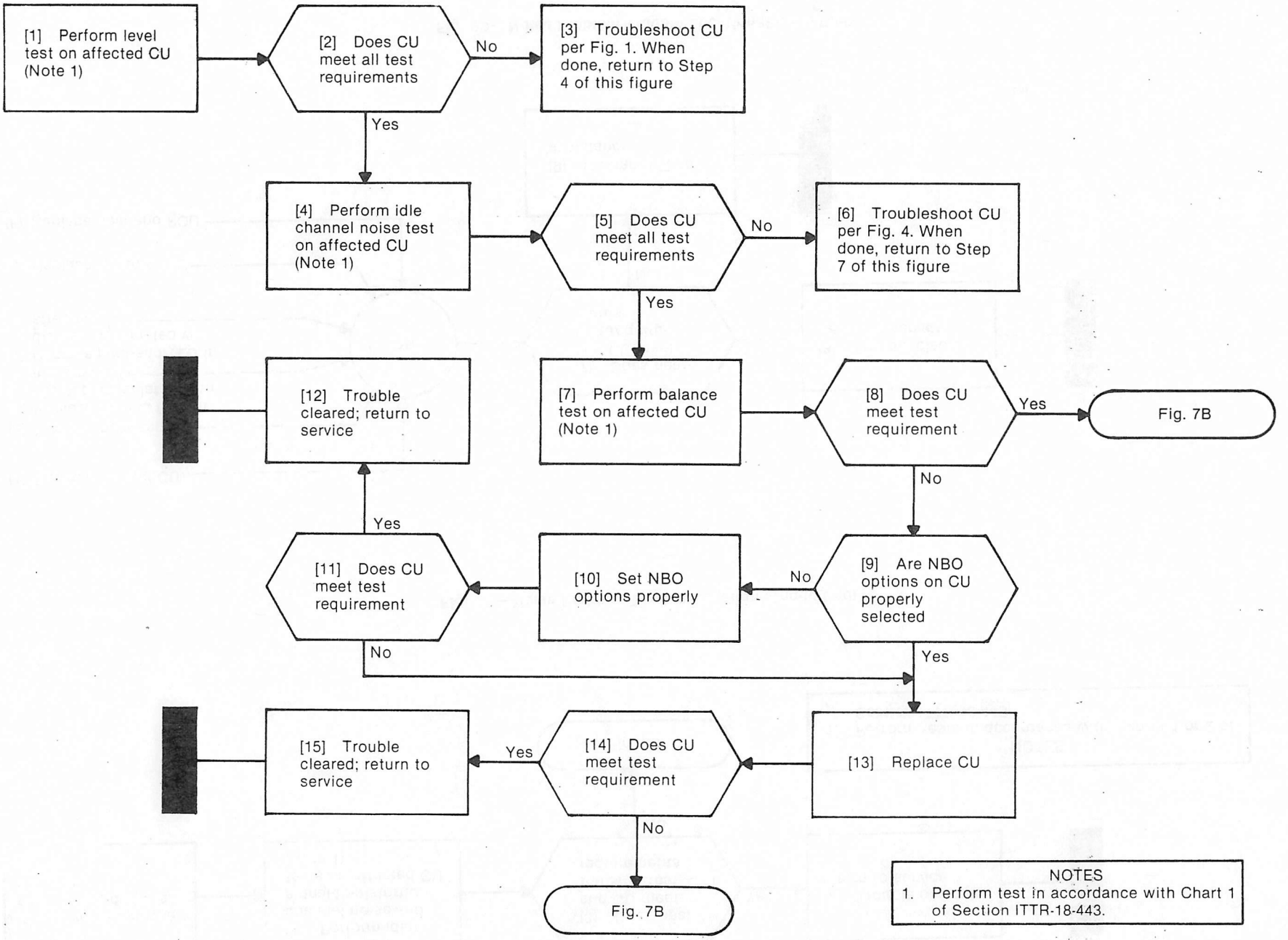

[1] Perform level test on affected CU (Note 1)
[2] Does CU meet all test requirements
No
[3] Troubleshoot CU per Fig. 1. When done, return to Step 4 of this figure
Yes
[4] Perform idle channel noise test on affected CU (Note 1)
[5] Does CU meet all test requirements
No
[6] Troubleshoot CU per Fig. 4. When done, return to Step 7 of this figure
Yes
[12] Trouble cleared; return to service
[7] Perform balance test on affected CU (Note 1)
[8] Does CU meet test requirement
Yes
Fig. 7B
No
Yes
[11] Does CU meet test requirement
[10] Set NBO options properly
No
[9] Are NBO options on CU properly selected
No
Yes
[15] Trouble cleared; return to service
Yes
[14] Does CU meet test requirement
[13] Replace CU
No
Fig. 7B
NOTES
1. Perform test in accordance with Chart 1 of Section ITTR-18-443.

Fig. 7A—Echo Trouble Location (Single-Ended)

A1845

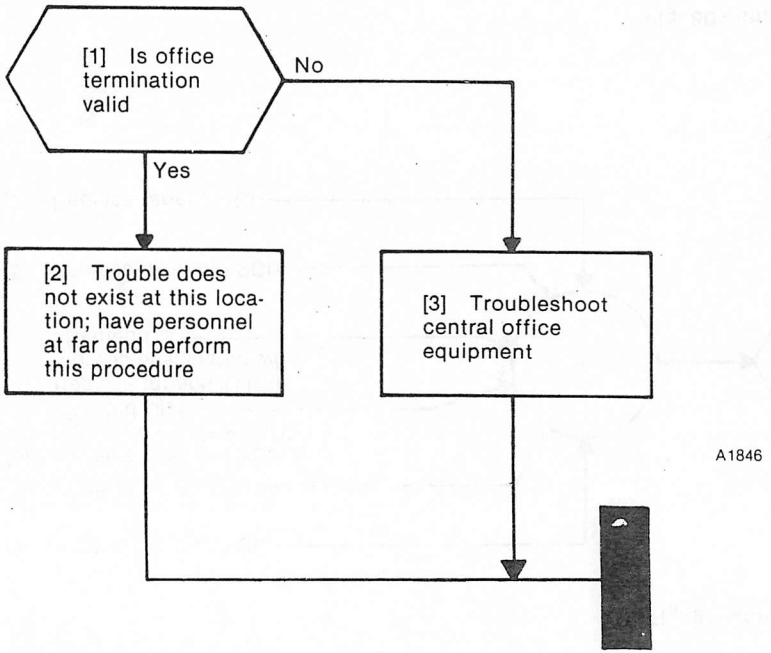

[1] Is office termination valid
No
Yes
[2] Trouble does not exist at this location; have personnel at far end perform this procedure
[3] Troubleshoot central office equipment
A1846

Fig. 7B—Echo Trouble Location (Single-Ended)

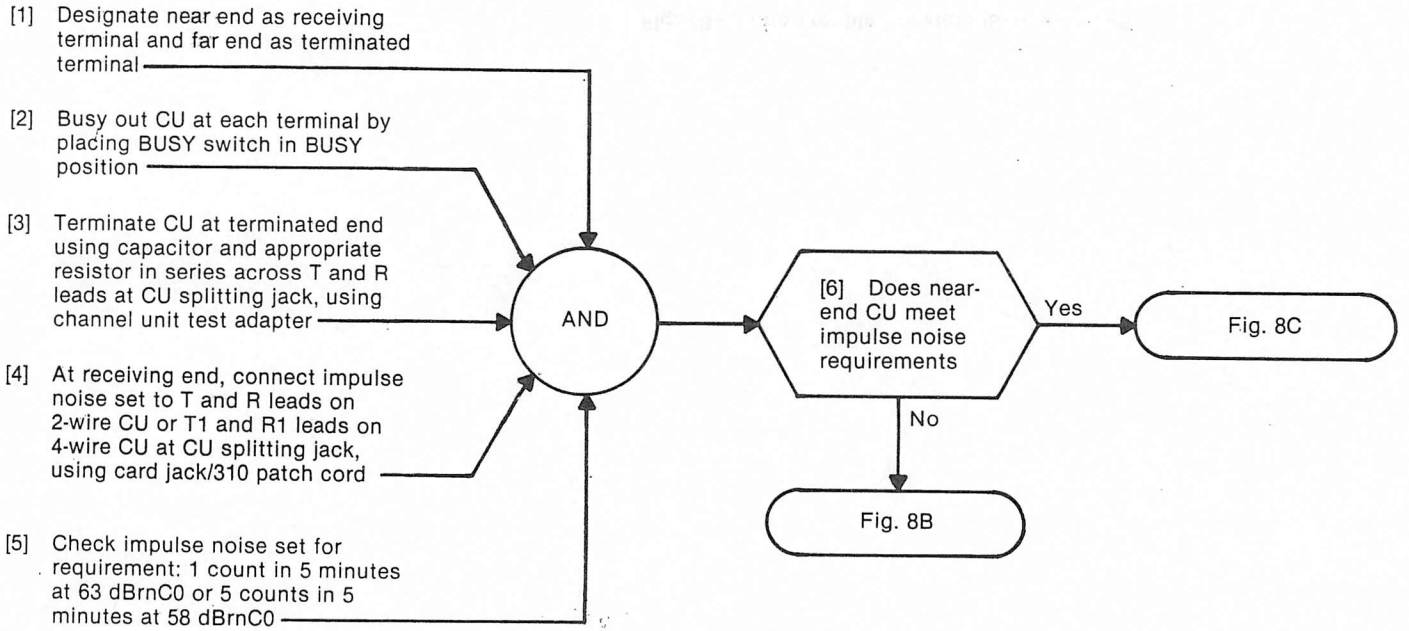

[1] Designate near end as receiving terminal and far end as terminated terminal
[2] Busy out CU at each terminal by placing BUSY switch in BUSY position
[3] Terminate CU at terminated end using capacitor and appropriate resistor in series across T and R leads at CU splitting jack, using channel unit test adapter
[4] At receiving end, connect impulse noise set to T and R leads on 2-wire CU or T1 and R1 leads on 4-wire CU at CU splitting jack, using card jack/310 patch cord
[5] Check impulse noise set for requirement: 1 count in 5 minutes at 63 dBrnC0 or 5 counts in 5 minutes at 58 dBrnC0
AND
[6] Does near-end CU meet impulse noise requirements
Yes
Fig. 8C
No
Fig. 8B

Fig. 8A—Impulse Noise Trouble Location (End-to-End)

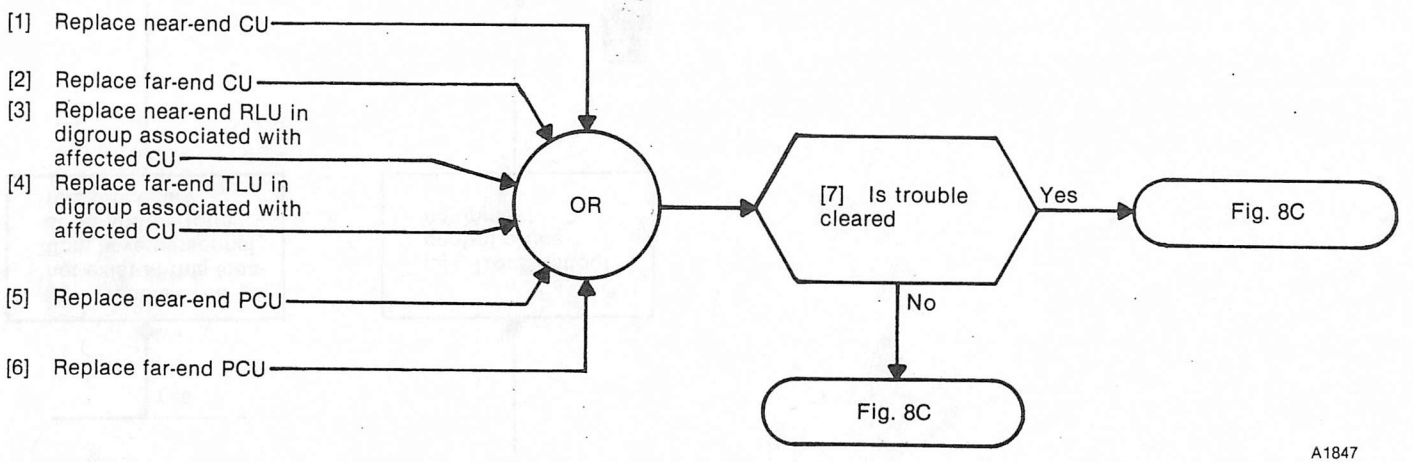


Fig. 8B—Impulse Noise Trouble Location (End-to-End)

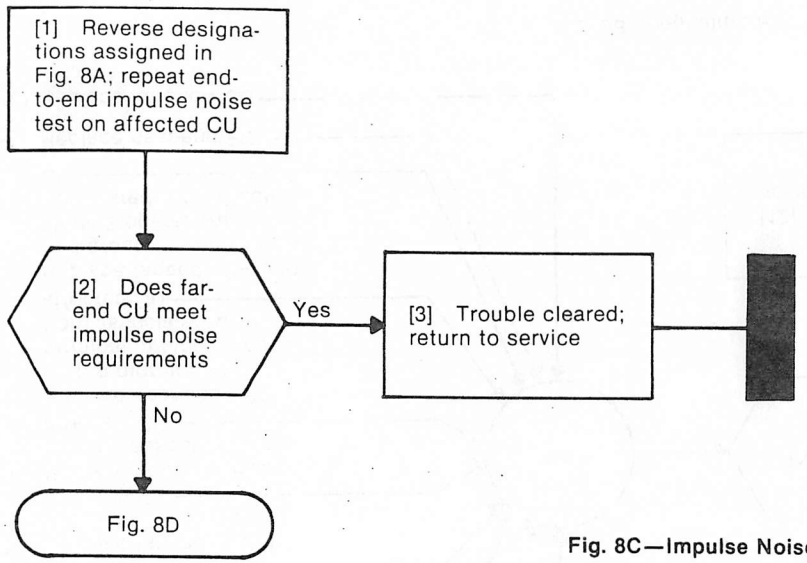

[1] Reverse designations assigned in Fig. 8A; repeat end-to-end impulse noise test on affected CU
[2] Does far-end CU meet impulse noise requirements
Yes
[3] Trouble cleared; return to service
No
Fig. 8D

Fig. 8C—Impulse Noise Trouble Location (End-to-End)

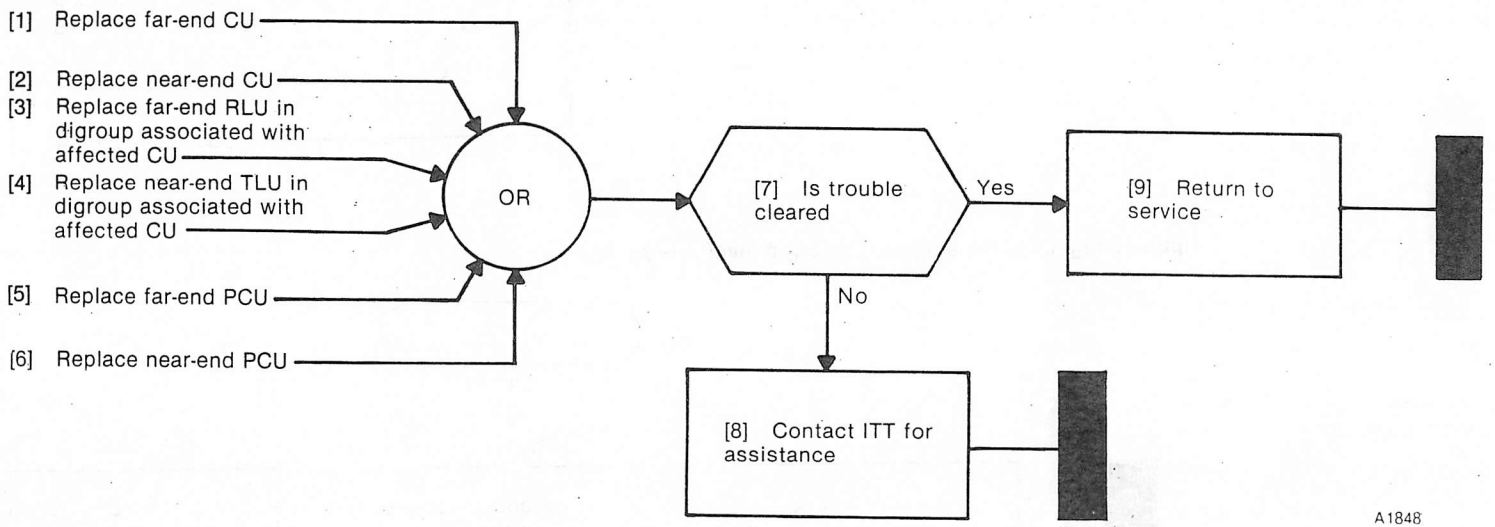

[1] Replace far-end CU
[2] Replace near-end CU
[3] Replace far-end RLU in digroup associated with affected CU
[4] Replace near-end TLU in digroup associated with affected CU
[5] Replace far-end PCU
[6] Replace near-end PCU
OR
[7] Is trouble cleared
Yes
[9] Return to service
No
[8] Contact ITT for assistance
A1848

Fig. 8D—Impulse Noise Trouble Location (End-to-End)

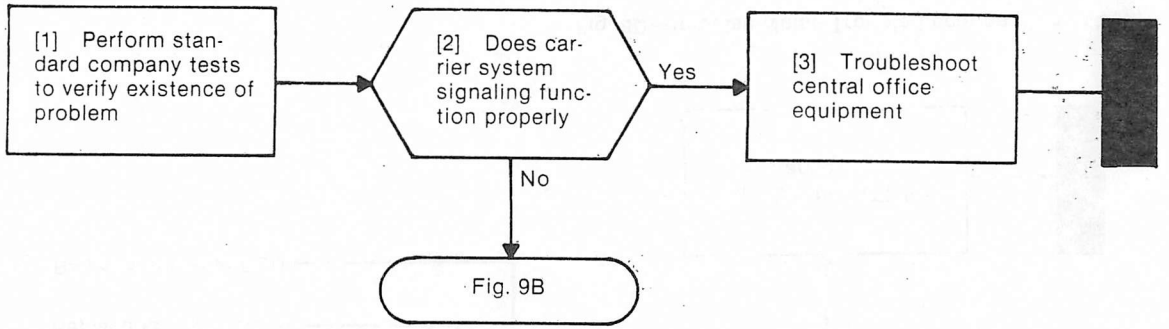

[1] Perform standard company tests to verify existence of problem
[2] Does carrier system signaling function properly
Yes
[3] Troubleshoot central office equipment
No
Fig. 9B

Fig. 9A—Signaling Problem Trouble Location (End-to-End)

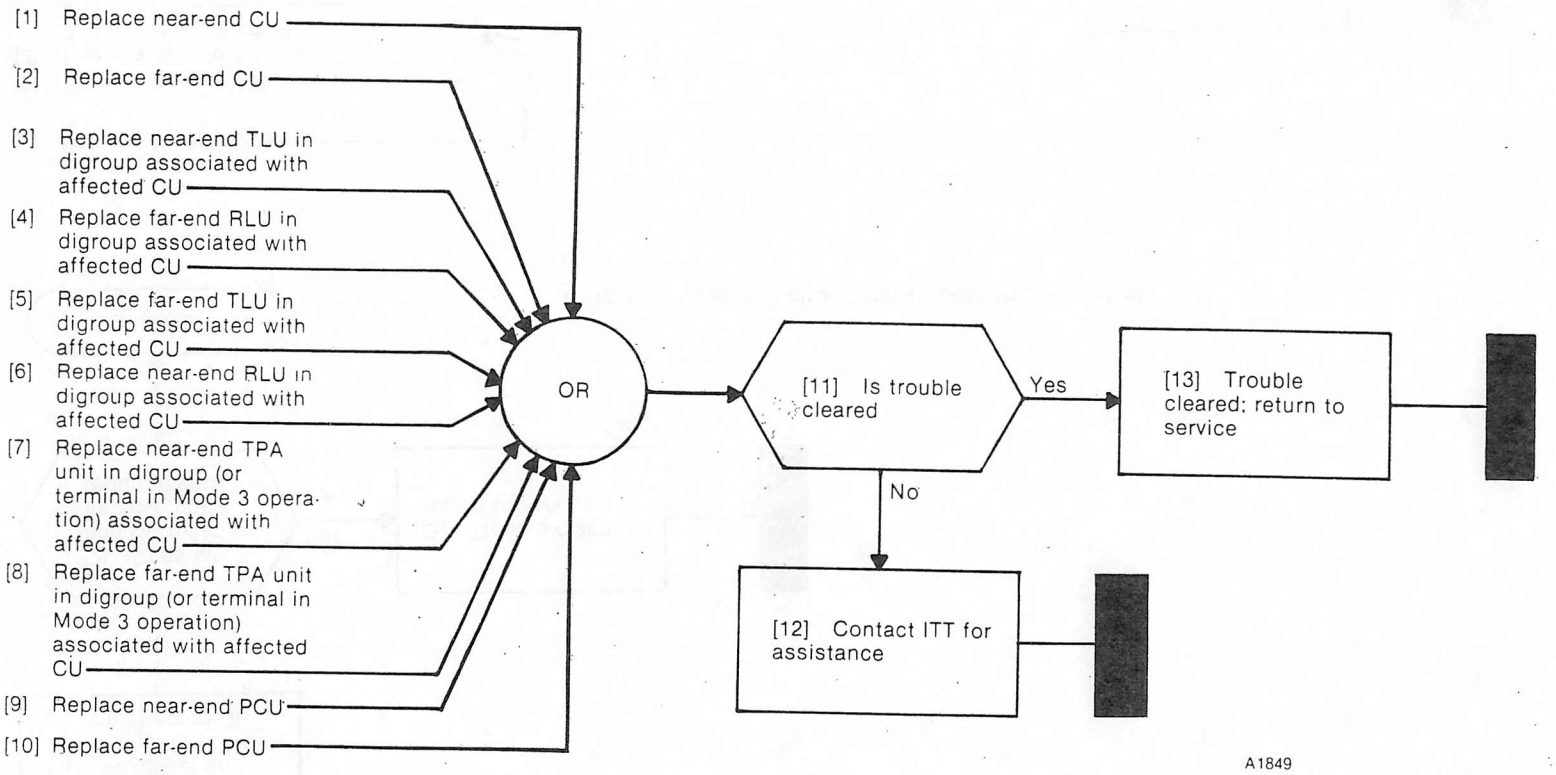

[1] Replace near-end CU
[2] Replace far-end CU
[3] Replace near-end TLU in digroup associated with affected CU
[4] Replace far-end RLU in digroup associated with affected CU
[5] Replace far-end TLU in digroup associated with affected CU
[6] Replace near-end RLU in digroup associated with affected CU
[7] Replace near-end TPA unit in digroup (or terminal in Mode 3 operation) associated with affected CU
[8] Replace far-end TPA unit in digroup (or terminal in Mode 3 operation) associated with affected CU
[9] Replace near-end PCU
[10] Replace far-end PCU
OR
[11] Is trouble cleared
Yes
[13] Trouble cleared; return to service
No
[12] Contact ITT for assistance
A1849

Fig. 9B—Signaling Problem Trouble Location (End-to-End)